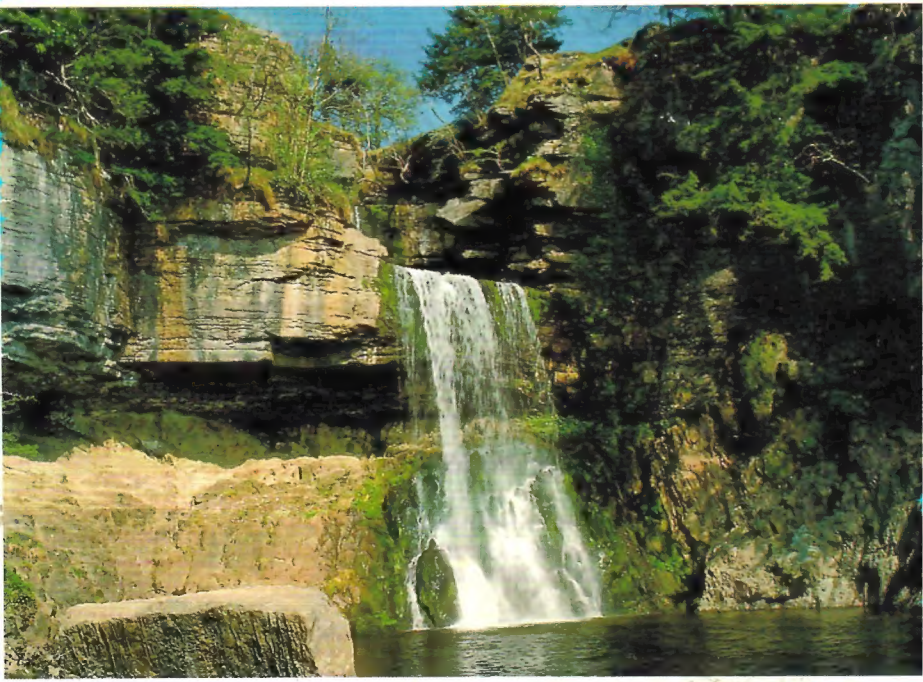
Ingleton Waterfalls Trail



Distance: 8 kilometres

Time required: 2½ to 4 hours

Terrain: The Trail follows a well-defined, laid footpath over moderately inclined ground. Where a climb is required, steps have been provided. **Great care is needed in wet or icy conditions when the path may become very slippery. At certain times it can be dangerous.**

The path through the Ingleton Glens is controlled by the Ingleton Scenery Company.

A small entrance fee is payable at the car park.

A Century of Public Enjoyment

The Waterfalls Trail follows a route through the Ingleton Glens first opened to the public by the Ingleton Scenery Company in 1885. Because of its outstanding beauty and wealth of interesting features, it has continued to attract visitors ever since.

Delightful waterfalls, rich and varied woodland and plant-life, and a fascinating geology all combine to make it very special.

The Ingleton Glens are particularly important to geologists, for here, superbly exposed, are the ancient basement rocks of the Pennine Dales. The Trail will convey you through hundreds of millions of years of geological time. As you step from one rock to another you will catch glimpses of past environments – deep oceans, mountain ranges and tropical seas – which in sum total have created the present-day landscape.

The Trail will also reveal how the different rocks support their own individual plant communities. In fact, the natural history of the Glens is of such national importance that the Nature Conservancy Council has designated a large part of them a Site of Special Scientific Interest (SSSI) in order to safeguard their future. Nevertheless, your help is needed if the Glens are to remain a captivating place for generations to come. Please do not stray from the footpath, take your litter home, and on no account deprive others of their enjoyment of the Trail by collecting rocks, fossils or wild flowers. You are reminded that all plants and many birds and animals are protected by law.

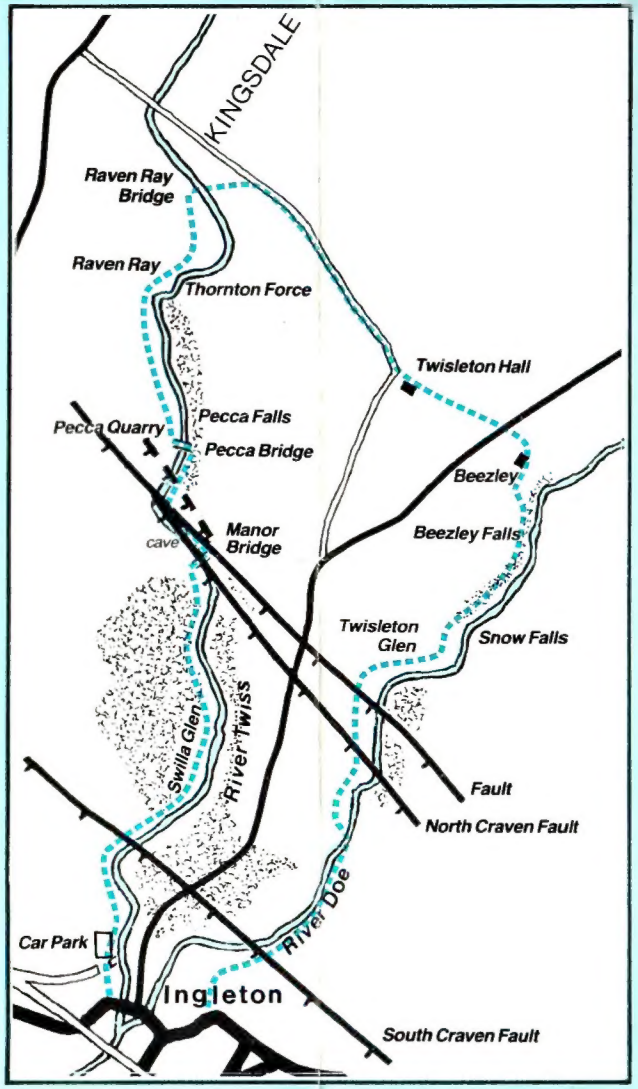
The Route

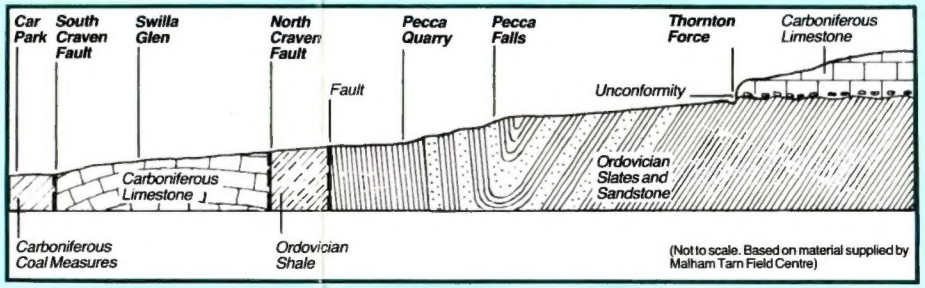
The Trail is completely waymarked and no navigational aids are required. It starts at the Waterfalls car park and follows the River Twiss upstream through Swilla Glen to the impressive cascades and waterfalls of Pecca Falls and Thornton Force.

From Thornton Force, you have a choice of return route:

a) return down the route by which you ascended the glen (total walk of 5km);

b) return down the neighbouring and equally splendid River Doe, via Beezley and Snow Falls and Twisleton Glen (a circular walk of 8km).

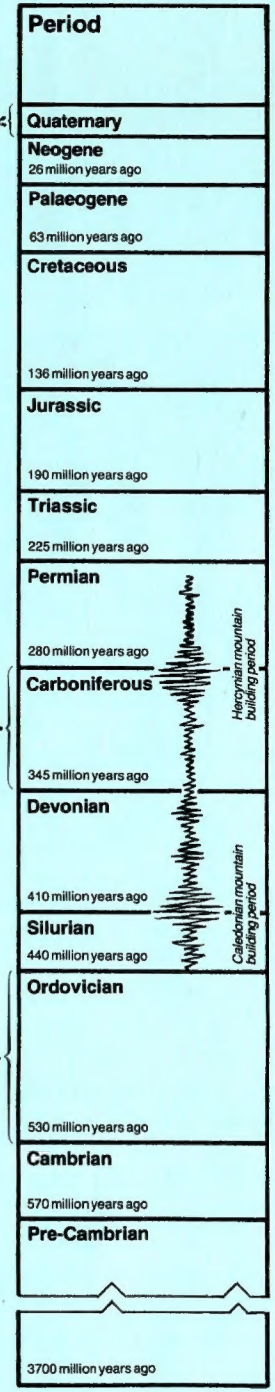




Geological time is divided into Periods, representing episodes during which particular groups of rocks were laid down.

Geological time represented in the rocks of the Trail.

A section through the valley of the River Twiss reveals the underlying geology.



Water Cut Valleys

The story of the Ingleton Glens goes back nearly 500 million years, but before we attempt to unravel this story in our ascent of the glen of the River Twiss, it is worth considering why such spectacular valleys developed here at all. The Rivers Twiss and Doe drain quite separate dales – the Twiss draining Kingsdale and the Doe draining Chapel-le-Dale. A look at a map will reveal that the floors of these valleys are 'perched' above Ingleton. In the case of the Twiss, the descent from Kingsdale amounts to over 100 metres in a distance of less than 3 kilometres.

The rock step into which the glens have been cut has formed because of the differing resistance to erosion of the rocks lying either side of the great earth fractures known as the Craven faults. Beneath your feet and forming the lower ground to the south are relatively easily eroded Upper Carboniferous shales and sandstones. But just to the north, across the east-west oriented faults, the higher ground into which the gorges and upper dales are cut comprises of strong, thickly bedded limestones and ancient basement rocks.

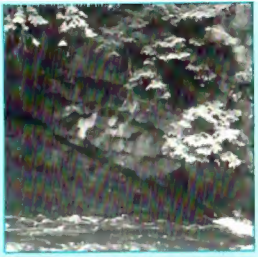
Glaciated valley of Kingsdale

Ice Age events have been especially important in the formation of the modern Twiss valley. Over the past two million years great ice sheets advanced and retreated across the Yorkshire Dales, their work nowhere better displayed than in the impressive glacial trough of Kingsdale. At the close of the last glaciation, some 12,000 years ago, the course of the Twiss was blocked at the dale exit by a terminal moraine – the ridge of rock debris we now call Raven Ray – deposited across the valley by the retreating Kingsdale glacier. Water from the lake that was created eventually overflowed at the lower end of the moraine. Over the years the Twiss developed this new course, dropping back into its old valley below the obstruction at Thornton Force.

Water flowing down such a steep slope has great erosive energy, and this was further enhanced at times over the past two million years by glacial meltwaters. The scale of the torrents that eroded the glens may be grasped by studying the boulder fan upon which the car park is built. As you walk to the start of the path consider the force of water that was necessary to transport some of the enormous boulders to be seen exposed in the riverbank.

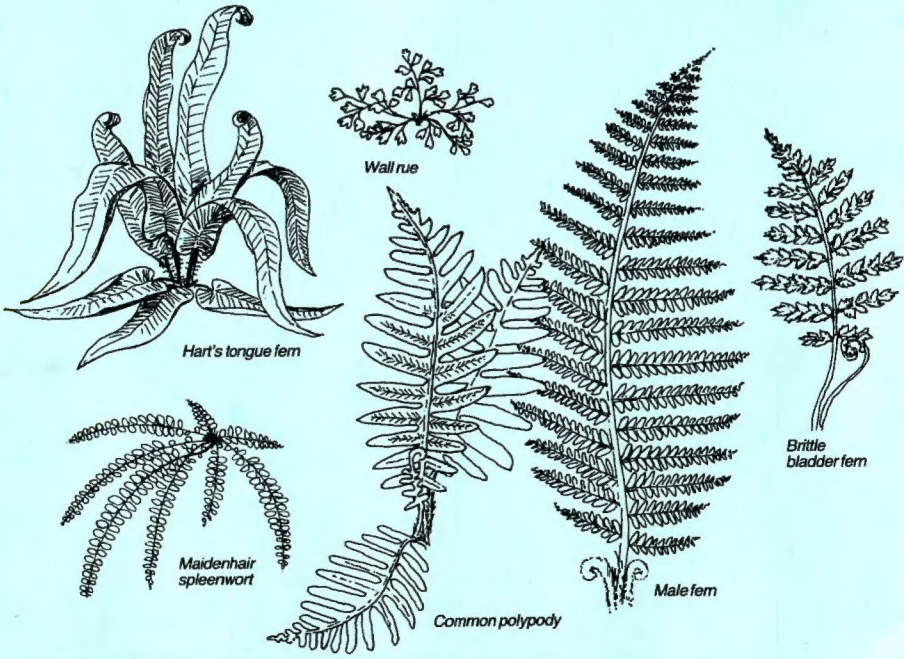
The Limestone Gorge

A pause at the second gate and you have stepped back over 300 million years to the early Carboniferous Period. This was a time when the Dales area was submerged beneath a shallow, tropical sea. Notice the rock across the river. This is limestone, formed of the calcite shells and skeletons of animals which lived in the warm sea. As they died their remains accumulated on the sea floor. This sediment was eventually buried, compressed and recrystallised into rock. Can you see how the beds, or strata, of rock dip downstream? This is because at one time the limestone was squeezed from either side by movements of the earth's crust and pressed into an arch or fold. You are now looking at one side of the fold and further along the Trail you will see the other side which will dip in the opposite direction.



Although laid down in horizontal beds the limestone strata at this point now dip downstream as a result of folding.

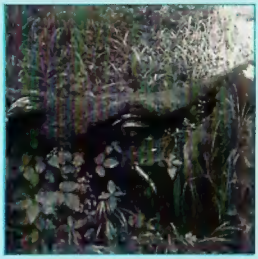
After passing through the gate you enter a delightful limestone gorge. The walls of limestone have a rich covering of mosses and liverworts, some of which are quite rare in Britain. The green-black slimy patches on the rock are very primitive plants called 'Blue-Greens', and the dry, light-coloured, crusty patches are colonies of lichens – organisms which are a combination of algae and fungi.



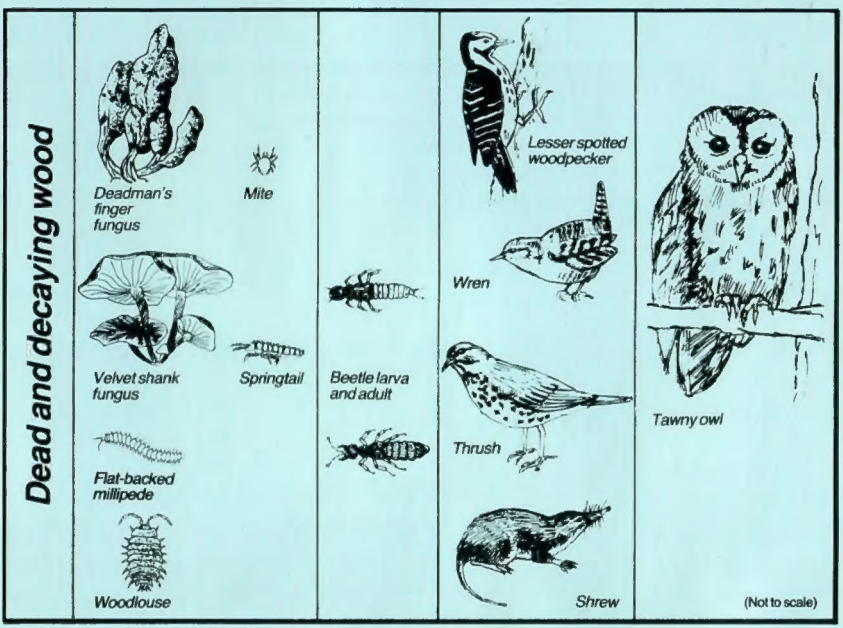
The damp, shaded conditions provide the ideal environment for ferns. Here are some of the species to be found. See how many you can spot along the trail.

Limestone Woodland

On leaving the gorge the valley gradually widens out and you enter a woodland similar in composition and structure to the primeval forest which covered much of Britain in Stone-Age times.



The woodland is a valuable wildlife habitat because there is a variety of species, and the trees are of different ages. Saplings are able to regenerate naturally here due to the absence of sheep grazing. As the trees mature they provide nest-sites for birds in spring; shade for sensitive plants in summer; and in autumn the leaves enrich the soil with humus. When they die the fallen trees add further to the diversity of woodland life.



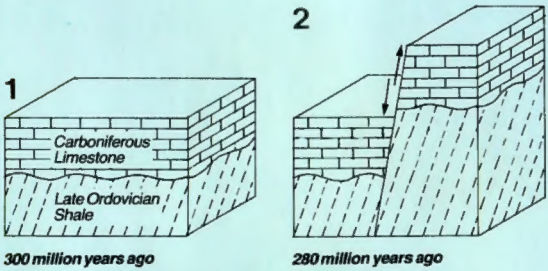
Dead and decaying wood is a rich source of food and home to many insects and fungi, which in turn are food for larger insects, birds and mammals.

Before you reach Manor Bridge you will pass a cliff of limestone with Yew trees growing precariously out of its face. Notice how the limestone is now dipping upstream. You have now crossed to the other side of the fold you saw earlier.

Faults

For a short distance above Manor Bridge the Twiss follows the line of the North Craven Fault. This is the most conspicuous of the great earth fractures in the region. It is best observed by looking upstream from the bridge. On the left Carboniferous limestone remains clearly exposed, while the right-hand bank is underlain by dark shale. The shale is at least 50 million years older than the limestone, having originated as mud deposits on the floor of the late Ordovician sea. The Carboniferous and Ordovician rocks rest side by side today because earth movements at the close of the Carboniferous caused the earth's crust to fracture and land on the south side of the resulting fault to subside relative to that on the north side.

About 100 metres upstream of Manor Bridge, pause opposite a short mined tunnel in the far bank. The North Craven Fault is complex and here it has several branches. One branch may be seen beside the tunnel. To the left of the fault is the limestone and on the right is a wedge of the late Ordovician shale. The tunnel was dug as a part of a fruitless search for lead on the fault.



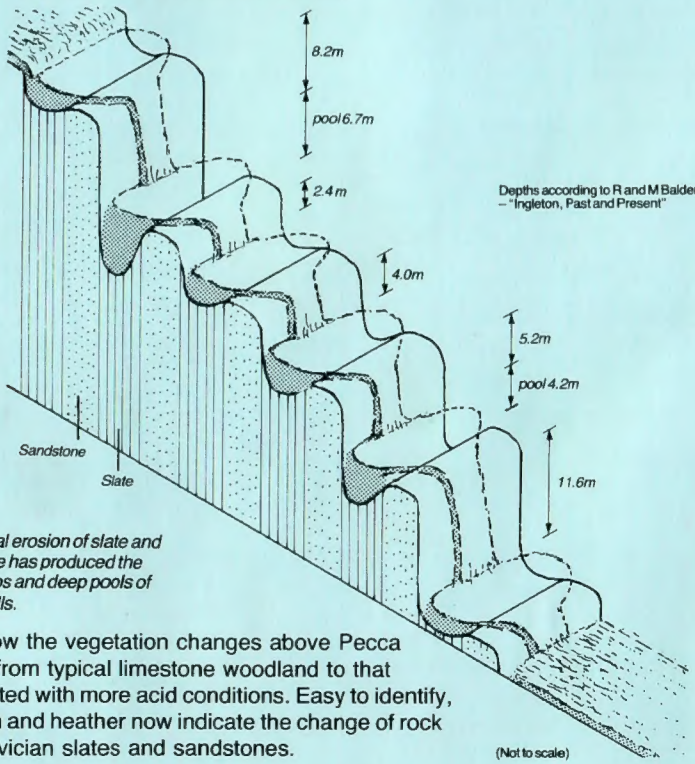
A vertical displacement of hundreds of metres occurred along the North Craven fault. Subsequent erosion then planed-off the land surface so that we now see shale and limestone resting against each other.

As you make your way to Pecca Bridge, you will cross another fault. This one is not easy to see, but it too caused land to the south to slip relative to that in the north. The presence of this fault explains why the Upper Ordovician shale now gives way to Lower Ordovician slates and sandstones.

Pecca Falls

The quarry at Pecca Bridge exposes a thick sequence of Lower Ordovician slates, but just upstream the slates alternate with beds of sandstone. Notice how these rocks have been folded up into the vertical position. One kilometre upstream at Thornton Force the slates first seen at Pecca Quarry are exposed again, but here they dip about 65° downstream. Originally laid as horizontal beds, the slates and sandstones were downfolded in Silurian times, forming a structure geologists call a syncline (see geological section at front of leaflet). You cross the axis of this syncline (ie the place where the dip of the Ordovician rocks changes) at the 'lemonade hut'.

Pecca Falls are an impressive sight. There are five main falls and they drop 30 metres over sandstone interbedded with slate. The falls were formed because the beds of rock are nearly vertical, and the slates are more easily eroded than the hard sandstone. The River Twiss, therefore, tumbles over the steps of sandstone, while the plunge pools, some of which are reputed to be as deep as the falls themselves, have been eroded from the slate.



Differential erosion of slate and sandstone has produced the steep steps and deep pools of Pecca Falls.

Note how the vegetation changes above Pecca Bridge from typical limestone woodland to that associated with more acid conditions. Easy to identify, bracken and heather now indicate the change of rock to Ordovician slates and sandstones.

Thornton Force

A level path now leads you to one of the finest geological sites in Britain.

At Thornton Force the River Twiss leaps 14 metres over a rock structure which encapsulates the whole fascinating geology of the area. Look closely at the rocks behind the waterfall. The upper part of the cliff consists of horizontally bedded Carboniferous limestone, while the lower part is of vertically bedded Lower Ordovician slates. The junction between the two is interesting because the slates have been planed-off and the limestone rests on this level surface. Geologists call this structure an 'unconformity' because the beds above and below the erosion surface have a different (i.e., not conformable) angle of dip.

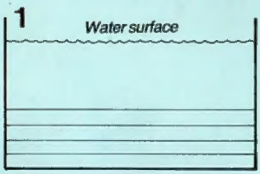
Consider what this tells us about the geological history. First, in early Ordovician times muds and sands were deposited in a deep ocean, compressed into rock, then later folded and uplifted into mountains. There then followed, in the Devonian Period, millions of years of erosion of this land mass. The dawning of the Carboniferous Period, over 300 million years ago, was marked by the advance of a warm, shallow sea across the eroded stumps of the former mountains and it was in this sea that the limestone was deposited.

Perhaps the most exciting thing about the cliff is that pebbles and boulders at the base of the limestone probably represent the early Carboniferous beach. So by standing on the ledge eroded across the slates you are literally standing on a land surface over 300 million years old!

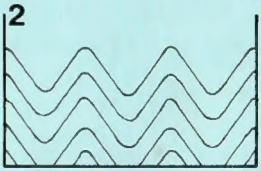
Buried valley

As you approach the corner of the river just prior to the Force, see if you can spot the now buried, former course of the Twiss. This is best done by tracing with your eyes the line of the river into the far river bank at the corner and observing the grass-covered slope of boulder clay that breaks the line of the valley-side scar. It now becomes obvious that Thornton Force is a very recent landscape feature, formed where the post-glacial river dropped back into the old valley. In the years to come erosion and backward retreat of the Force is destined to create a quite spectacular new gorge along the new river course.

The geology of Thornton Force tells a fascinating story.

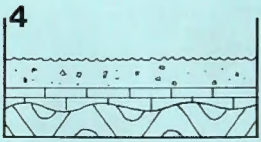


Deposition of muds and sands in deep ocean.

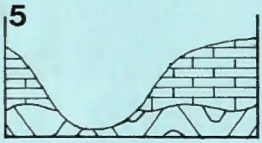


Uplift and folding of ocean floor to produce mountains.

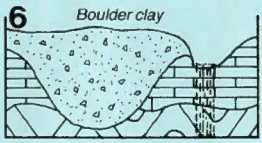
Subsequent erosion of this new formed land.



Submergence of land beneath warm, shallow sea. Deposition of limestone and later deposits.



Uplift and erosion of limestone, culminating in erosion of modern day Kingsdale in Ice Age landscape.



Burial of old valley and creation of new river course to provide Force.

Kingsdale

Above Thornton Force the footpath into Kingsdale follows the post-glacial route of the Twiss around the terminal moraine of Raven Ray. The moraine and former lake bed may be clearly observed from the green lane leading to Twistleton Hall, or by making a short detour onto the Kingsdale road. Kingsdale, with its many caves and other karst features, is worthy of study in its own right. For those interested, details of its interesting landscape may be found in the national park's booklet *Karst and Caves.*

The Return Route

You now have a choice. You can either retrace your steps, or complete the circuit to Ingleton, via Beezley Falls and Twisleton Glen.

If taking the longer route: on reaching Twisleton Lane, a green road, turn right and follow it to Twisleton Hall. Leave the lane at the Hall and continue ahead across the next stile, keeping the farm buildings on your right. Magnificent views of Ingleborough (723m) are provided as you make your way towards Beezley Farm. Descend to the River Doe through the farmyard, and head downstream as it leaps over Beezley Falls, races through Baxenghyll Gorge and tumbles over Snow Falls on its way to Ingleton.

Yorkshire Dales National Park

The Yorkshire Dales National Park comprises 1760 square kilometres of scenically outstanding countryside in the central Pennine uplands. It is one of ten areas in England and Wales that were selected for national park status under the National Parks and Access to the Countryside Act 1949 and it was officially designated as the third largest national park in 1954.

Under the act, responsibility for the national park has been vested in the Yorkshire Dales National Park Committee. It is the statutory duty of this committee to preserve and enhance the natural beauty of the area, while also providing opportunities for suitable forms of outdoor recreation.

The land of the national park is not publicity owned. Virtually all of it is farmland and remains in the hands of private landowners. There are no additional rights of access and visitors have the same responsibilities as in any other area of countryside. If you are in any doubt, further information about the national park, the local community and the landscape may be obtained from any one fo the six national park centres.

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